Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) A method for separating an isotope of thallium in an atomic vapor containing a plurality of isotopes of thallium, said method comprising the steps of:

(a) producing photons of a first frequency by a laser system, wherein a wave length of said first frequency is about 378 nm;

(b) producing photons of a second frequency by said laser system, wherein a wave length of said second frequency is about 292 nm;

(c) producing photons of a third frequency by said laser system, wherein a wave length of said third frequency is in the range of 700 nm to 1400 nm;

(d) applying said photons of said first, second and third frequencies to said vapor, wherein said photons of said first frequency pump isotope-selectively a plurality of ground state thallium atoms through an excited state into a metastable state, and wherein said photons of said second frequency excite a plurality of metastable state thallium atoms to an intermediate, resonant state, and wherein said photons of said third frequency ionize a plurality of atoms in said intermediate, resonant state through continuum states; and

(e) collecting said isotope ions.

2. (Currently Amended) The method of claim 1 wherein said ~~photon~~ photons of said first frequency ~~is produced~~ are produced by one or more continuous wave lasers.

3. (Previously Presented) The method of claim 1 wherein the photons of said first frequency pump said atoms of thallium from the ground state through the excited state at an energy of 26477.6 cm^{-1} relative to zero energy of the ground state and into the metastable state at an energy of 7793 cm^{-1} relative to the zero energy of the ground state.

4. (Previously Presented) The method of claim 1 wherein the photons of said second frequency are produced by one or more pulsed lasers.

5. (Previously Presented) The method of claim 1 wherein the photons of the second frequency excite the thallium atoms in the metastable state to the intermediate resonant state at an energy of 42049.0 cm^{-1} relative to zero energy of said ground state.

6. (Previously Presented) The method of claim 1 wherein the photons of the second frequency excite the thallium atoms in the metastable state to the intermediate, resonant state at an energy of 42011.4 cm^{-1} relative to zero energy of said ground state.

7. (Previously Presented) The method of claim 1 wherein the photons of said third frequency are produced by one or more pulsed lasers.

8. (Previously Presented) The method of claim 1 wherein the photons of the third frequency ionize atoms in the intermediate, resonant state at an energy of 42049.0 cm^{-1} to the continuum states at an energy range of 49266.7 cm^{-1} ~ 55000 cm^{-1} relative to zero energy of said ground state.

9. (Previously Presented) The method of claim 1 wherein the photons of the third frequency ionize atoms in the intermediate, resonant state at an energy of 42011.4 cm^{-1} to continuum states at an energy range of 49266.7 cm^{-1} ~ 55000 cm^{-1} relative to zero energy of said ground state.

10. (Original) The method of claim 1 wherein the step of collecting said isotope ions comprises applying an electric field to said vapor.

11. (Previously Presented) The method of claim 4 wherein the photons of the second frequency excite the thallium atoms in the metastable state to the intermediate, resonant state at an energy of 42049.0 cm^{-1} relative to zero energy of said ground state.

12. (Canceled)